Article

Memories of Peak Oil

By Vaclav Smil

February 21, 2013

When the final figures for the fourth quarter of 2012 are in, the world will have a new crude oil production record: the total for the first three quarters was about 1 percent ahead of the 2011 total. This is a remarkable achievement for a commodity with annual output that now surpasses, for the first time ever, 4 billion metric tons and which has been, for decades, the largest source of fossil energy and the most valuable item of international commerce.

Global oil extraction was down in 2009 (2.5 percent lower than 2008 levels), but that had nothing to do with declining reserves and everything to do with weakened demand in the midst of the world's worst postwar economic recession. That dip was brief; in 2010 global output was up by 2 percent and in 2011 it went up another 1.3 percent to surpass the 2008 record and come up less than 5 million metric tons (Mt) shy of the 4 billion metric ton mark. What is even more remarkable is how widely this rise has been shared: this becomes clear by looking at what happened to global output and to major oil powers' oil production during the first decade of the 21st century.

These are the percentage increases for crude oil extraction between 2001 and 2011: global production was up by 10.8 percent, and Saudi Arabia's output was 20 percent larger. So much for any imminent collapse of the country's supergiant oilfields, a claim that made Matthew Simmons a temporary celebrity. Russia's production was 47 percent higher, but that large rise reflects the recovery from a prolonged post-1991 extraction dip caused by the economic problems of post-Soviet Russia. Much more impressive gains were achieved by two former Soviet republics: Kazakh oil output doubled in the 10 year period, and Azeri oil production tripled!

> The most remarkable story has been unfolding in the United States, where horizontal drilling and hydraulic fracturing have been rapidly adopted.

Total output in the Middle East in the decade after 2001 — despite continued politically induced underperformance of the oil industry in Iraq and production problems and trade sanctions affecting Iran — rose by 17 percent. High flyers in other regions included Canada (output was up 37 percent, nearly all of it due to the rising recovery from Alberta's oil-bearing sands), Colombia (up 49 percent), Brazil (up 63 percent), and Angola (2.3 times higher in 2011 than in 2001).

But the most remarkable story has been unfolding in the United States, where horizontal drilling and hydraulic fracturing (commonly referred to as fracking, pioneered on a large commercial scale by natural gas producers) have been rapidly adopted by oil drillers and have led to a remarkable turnaround in U.S. crude oil extraction. Until 2008, the country's crude oil production kept following its long-established gradual decline (the output peaked in 1970 at 533.5 Mt), and between 2001 and 2008 it dropped by nearly 13 percent, from 349.2 Mt to 304.9 Mt.

The reversal has been impressive: from 2008 to 2011, extraction rose by nearly 50 Mt to just over 352 Mt, a level last seen in the year 2000; the increase over those three years was more than the total 2011 output of such oil powers as Indonesia or Azerbaijan. North Dakota (Bakken shale) has been the principal locus of this production renaissance. At the beginning of the year 2000 there were fewer than 200 oil wells producing from the Bakken deposits, averaging about 10 barrels a day per well; by October 2012, there were nearly 4,800 wells with average daily flow of about 140 barrels of oil per well. North Dakota's oil output was 37 percent ahead of Alaska's North Slope extraction and behind only Texas and the offshore production in the Gulf of Mexico.

A forecast by the U.S. Department of Energy sees a possible production increase of as much as 140 Mt/year by 2025, and the most recent review by the International Energy Agency (IEA) even sees the United States as the world's largest crude oil producer as early as 2017. That may be too much to expect but, in any case, U.S. oil output disproves any preordained and immutable validity of Hubbert's curves (which attempt to infallibly predict U.S. and world oil output for decades to come! No wonder that Leonardo Maugeri, the former senior executive vice president of strategies and development for Italy's largest oil and gas company, ENI, speaks about a genuine oil revolution).

> Total output in the Middle East in the decade after 2001 rose by 17 percent.

But the IEA also says that the world has already reached the peak of conventional oil extraction and that the continuing rise in output is now due only to rising recovery of unconventional sources including extra heavy oil, oil sands, and gas converted to liquids. But that conclusion rests on accepting an arbitrary divide between the two categories. The oil industry has always pushed the boundaries of extraction: going first deeper as rotary drills displaced old percussion drilling, then offshore but within the sight of land in shallow waters, then far offshore in deeper water, then deploying directional and horizontal drilling and recovery of heavy oils, and (starting in 1967) extraction of oil from tar sands.

The IEA admits that "the categories 'conventional' and 'unconventional' do not remain fixed, and over time, as economic and technological conditions evolve, resources hitherto considered unconventional can migrate into the conventional category." Indeed, they have been doing so for decades, and will do so for decades to come.

Obviously, there will come a time when global oil extraction will reach its peak, but even that point may be of little practical interest as it could be followed by a prolonged, gentle decline or by an extended output plateau at a somewhat lower level than peak production. At the beginning of 2013, there are no signs that the beginning of this new oil era (regardless of its specific course) is imminent, and forecasting its onset remains an exercise in futility. Only one thing is abundantly clear to me: for the past 15 years I have been quite confident that there is no imminent danger of any sharp peak of global oil extraction followed by an inexorable production slide — and early in 2013 that confidence is greatly strengthened by new facts. Is it too much to hope that even some catastrophists and peak-oil cultists will find it impossible to ignore those numbers?

Vaclav Smil does interdisciplinary research in the fields of energy, environmental and population change, food production and nutrition, technical innovation, risk assessment, and public policy.

FURTHER READING: **Smil also writes "Just How Polluted Is China Anyway?" "Jeremy Grantham, Starving for Facts," and "Far from Electrifying." Desmond Lachman contributes "Gushing about America's Energy Future." Mark J. Perry blogs about how "U.S. Oil Output Increased by 23 Percent During the Second Week of January, to Highest Level of Domestic Production in 20 Years" and "In Just a 6-Year Period from 2008 to 2014, Fracking Will Completely Reverse a 22-Year, 41 Percent Decline in U.S. Oil Output."**

Image by Dianna Ingram / Bergman Group

Vaclav Smil

Latest Work

March 11, 2015

Article

Low Oil Prices: Who Are the Losers?

December 22, 2014

Article

Are Low Oil Prices Good or Bad?

October 29, 2014

Article

Who Really Leads the World in Trade?

Tags:

Donate Subscribe

About

About AEI

Organization and Purpose

Leadership

Annual Report

Contact

American Enterprise Institute
1789 Massachusetts Avenue, NW Washington, DC 20036

Main telephone: 202.862.5800

Main fax: 202.862.7177

Policy Areas

Economics

Foreign and Defense Policy

Health Care

Education

Politics and Public Opinion

Poverty Studies

Society and Culture

Technology and Innovation

Legal and Constitutional Studies

Scholars

Find a scholar by policy area:

Agricultural Policy Studies

Economics

Education

Foreign and Defense Policy

Health Care

Housing

Legal and Constitutional

Politics and Public Opinion

Poverty Studies

Science, Energy, and Environment

Society and Culture

Technology and Innovation